Permit Fact Sheet

General Information

Permit Number:	WI-0066648-01-0
Permittee Name:	Essential Industries Inc
Address:	28391 Essential Rd
City/State/Zip:	Merton, WI 53056
Discharge Location:	43.148425, -88.31142
Receiving Water:	Bark River (Bark River Watershed, Rock River Basin) in Waukesha County
StreamFlow ($Q_{7,10}$):	7.1 cfs
Stream Classification:	Warm water sport fish community, non-public water supply

Facility Description

Essential Industries produces polymers and resins for floor finishes as well as a variety of detergents and packaged finished goods for the sanitary maintenance supply industries. Soft water and reverse osmosis (RO) water are used or producing the soap and detergent products. The discharge is comprised of RO filter water discharge (approximately 365 gpd), water softener brine water discharge (approximately 240 gpd), and noncontact cooling (NCCW) (approximately 69,000 gpd). These wastewaters are combined and discharged to the Bark River through a single outfall.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
001	0.07 MGD maximum annual average	Combined wastewater discharge from water softener brine discharge, reverse osmosis filter discharge, and non-contact cooling water. Representative grab samples collected at outfall prior to Bark River.

Surface Water - Proposed Monitoring and Limitations

Sample Point Number: 001- NCCW, RO & Water Softener

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		gpd	Monthly	Total Daily	
Temperature		deg F	Monthly	Grab	Monthly monitoring during calendar year 2024.
BOD5, Total		mg/L	Annual	Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
pH Field	Daily Max	9.0 su	Quarterly	Grab	
pH Field	Daily Min	6.0 su	Quarterly	Grab	
Nitrogen, Ammonia (NH3-N) Total		mg/L	Annual	Grab	
Oil & Grease (Hexane)	Daily Max	15 mg/L	Annual	Grab	
Oil & Grease (Hexane)	Monthly Avg	15 mg/L	Annual	Grab	
Suspended Solids, Total	Daily Max	40 mg/L	Monthly	Grab	
Suspended Solids, Total	Monthly Avg	40 mg/L	Monthly	Grab	
Suspended Solids, Total	Monthly Avg	1.98 lbs/day	Monthly	Calculated	
Chloride	Daily Max	1,510 mg/L	Monthly	Grab	Limit becomes effective November 1, 2022. See schedules section 2.1.
Chloride	Weekly Avg	1,510 mg/L	Monthly	Grab	Limit becomes effective November 1, 2022. See schedules section 2.1.
Chloride	Monthly Avg	1,510 mg/L	Monthly	Grab	Limit becomes effective November 1, 2022. See schedules section 2.1.
Phosphorus, Total	6-Month Avg	0.075 mg/L	Monthly	Grab	Final limit becomes effective November 1, 2028. Narrative interim limit is effective immediately. See subsection 1.2.1.2 for narrative limit requirement and schedules subsection 2.2
Phosphorus, Total	Monthly Avg	0.225 mg/L	Monthly	Grab	Final limit becomes effective November 1, 2028. Narrative interim limit is effective immediately. See subsection 1.2.1.2 for narrative limit requirement and schedules subsection 2.2

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Total	Monthly Avg	0.0438 lbs/day	Monthly	Calculated	Final limit becomes effective November 1, 2028. Narrative interim limit is effective immediately. See subsection 1.2.1.2 for narrative limit requirement, schedules subsection 2.2, and subsection 3.3.2 for calculation formula.

Explanation of Limits and Monitoring Requirements

Monitoring and reporting for **BOD5, Total (Biochemical Oxygen Demand), Nitrogen, Ammonia (NH3-N) Total, pH,** and **Oil & Grease** are being retained from the permittee's previous monitoring requirements under the non-contact cooling water general permit in accordance with antibacksliding requirements of NR 207.12, Wis. Adm. Code. The frequency of monitoring has not changed for these parameters. Monitoring may be removed from future permit terms once more data is collected.

Temperature

Although there is not a full year's worth of representative temperature data, a comparison of the available data was used for other months of the year because the effluent temperature is not expected to vary by month. Based on the temperature data collected to date, there is not reasonable potential that the effluent will exceed a daily maximum limit of 120 °F. Monthly monitoring for temperature is included in the fourth calendar year of the permit so that future analysis can be completed on a full year's worth of data ahead of the permit expiration date.

Chloride

The single chloride data point was collected with the permit application, and is representative of the reverse osmosis discharge and water softener brine. This single-point chloride concentration of 9800 mg/L exceeds one fifth of the calculated effluent limits to be protective of chronic and acute toxicity. Therefore, both a daily maximum and weekly average limit must be included in the permit in accordance with NR 106.05(3)(a), Wis. Adm. Code. In addition, NR 106.07(4), Wis. Adm. Code., requires inclusion of a monthly average limit set equal to the daily maximum limit when whenever there is a daily maximum limit necessary to protect water quality.

It is expected that chloride concentrations will decrease substantially once the non-contact cooling water is combined with the reverse osmosis and water softener brine in the discharge. The one available chloride sample concentration was collected from only RO water discharge and water softener brine discharge. A short compliance schedule is included in the permit for further data collection and to allow time for the permittee to develop an action plan with operational improvements and/or minor modifications before the final limit takes effect November 1, 2022.

Total Suspended Solids

A concentration-based limit of 40 mg/L expressed as a monthly average and daily maximum and a mass-based limit of 0.198 lbs/day expressed as a monthly average are included in this permit. Though the monthly WLA for the facility is based on a more restrictive concentration, the TSS limit of 40 mg/L under the Non-Contact Cooling Water general permit is being retained in the permittee's individual permit to comply with antibacksliding requirements of NR 207.12, Wis. Adm. Code. Total Maximum Daily Loads for TSS in the Rock River Basin were approved by EPA on September 28, 2011. Once EPA approves a TMDL, WPDES permits that are issued or reissued must be consistent with the TMDL WLAs. The permittee was previously covered under a grouped allocation of 14,000 lbs/year for general permit holders in

"Reach 55", which is identified as a 6-miles section of the Bark River starting at about 0.7 miles east of State Highway 67 and running through the Village of Dousman west to its confluence with the Scuppernong River. The calculated mass-based limit was determined by applying the permittee's maximum annual average flow of 0.070 MGD to the maximum TSS concentration of 3.40 mg/L. The resulting monthly WLA is expressed as a monthly average to be consistent with the approved TMDL and represents approximately 5% of the general permit grouped allocated load.

Total Phosphorus

A mass-based limit of 0.048 lbs/day expressed as monthly average is included in this permit. As with the inclusion of a monthly WLA for total suspended solids, a monthly WLA for total phosphorus must be included in the permit to be consistent with the approved Rock River Basin TMDL. The grouped allocation for general permit holders in Reach 55 is 74.51 lbs/year. The same methodology of applying the maximum concentration to the permittee's maximum annual average flow could not be used for total phosphorus as this would have resulted in an allocation representing approximately 86% of the general permit grouped allocated load. Therefore, an alternative approach was taken by applying the in-stream water quality phosphorus criteria of 0.075 mg/L to the permittee's maximum annual average flow. This approach results in a more equitable distribution of the phosphorus load to the permittee of approximately 21% of the general permit grouped allocated load. Back calculating a mass-based limit proportional to the 5% distribution of TSS would have resulted in an equivalent concentration below the criteria itself.

As the phosphorus wasteload allocations of the Rock River Basin TMDL are not protective of the immediate receiving water where the discharge is located, a concentration-based WQBEL of 0.075 mg/L expressed as a six-month average and 0.225 mg/L expressed as a monthly average are also necessary to satisfy NR 217.13, Wis. Adm. Code, and are included in the permit.

In addition, NR 217.17, Wis. Adm. Code requires inclusion of an interim limit when a compliance schedule is granted to meet the final water quality-based effluent limit. There is a very limited phosphorus dataset at the time of issuing the permit, therefore a narrative limit is included in lieu of a numeric limit. This narrative limit requires maintenance of operations and any optimization activities started with coverage under the Non-Contact Cooling Water general permit to ensure that the amount of phosphorus does not increase annually over the length of the compliance schedule until the final limit takes effect November 1, 2028.

Schedules

2.1 Water Quality Based Effluent Limits (WQBELs) for Chloride

This compliance schedule requires the permittee to achieve compliance with the water quality based effluent limits (WQBELs) for chloride by the specified date.

Required Action	Due Date
Report on Effluent Discharges and Action Plan: The permittee shall prepare a report on effluent discharges and submit it for Department approval. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor modifications that would enable compliance with the final chloride WQBELs (water quality based effluent limit) or some improved level of effluent quality. The report shall include an action plan and schedule for completion.	10/31/2021
Complete Actions: Complete actions necessary to achieve compliance with the effluent limitations.	10/31/2022

2.2 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

No later than 30 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance with the required action. If a submittal is part of the required action, then a timely submittal fulfills the written notification requirement.

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by October 31, 2024. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than October 31, 2024 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report. If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by October 31, 2024 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance'). STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than January 1, 2028.	10/31/2021
Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.	10/31/2022
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee’s wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan.	10/31/2023

If water quality trading will be undertaken, the plan must state that trading will be pursued.	
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	10/31/2024
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	10/31/2025
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	10/31/2026
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2027
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2027
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2027
Complete Construction & Achieve Compliance: The permittee shall complete construction of wastewater treatment system upgrades and achieve compliance with the final phosphorus WQBELs.. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	11/01/2028

Explanation of Compliance Schedules

Water Quality Based Effluent Limits (WQBELs) for Chloride

It is expected that chloride concentrations will decrease substantially once the non-contact cooling water is combined with the reverse osmosis and water softener brine in the discharge. The one available chloride sample concentration was collected from only RO water discharge and water softener brine discharge. A short compliance schedule is included in the permit for further data collection and to allow time for the permittee to develop an action plan with operational improvements and/or minor modifications to meet the limit by November 1, 2022.

Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

As there is a very limited phosphorus dataset at the time of issuing the permit, a compliance schedule is granted to allow time for more data collection, evaluation, and development of an action plan to comply with the final limit by November 1, 2028. The compliance schedule is in accordance with ch. NR 217.17(2), Wis. Adm. Code. Such a schedule is deemed appropriate in this case as the final WQBELs are considered stringent and may not be technologically and/or economically achievable using current wastewater treatment methodology

Attachments:

Water Quality Based Effluent Limits Memo prepared by Nicole Krueger, Water Resources Engineer

Proposed Expiration Date:

October 31, 2025

Prepared By:

Bryan Hartsook **Wastewater Field Supervisor**

Date: